Original Article

Exploring Anxiety and Depression Across ABO Blood Groups Among Future Healthcare Professionals

Ibrar Ali, Muhammad Saqib, Abdal Khan, Maaz Khan, Roha Shah & Shireen Jawed

ABSTRACT

Objective: To explore depression & anxiety across ABO blood groups of medical, dental, physiotherapy and nursing students.

Methodology*:* A cross-sectional study was conducted at Frontier Medical and Dental College, Abbottabad, from April to May 2025 after IRB approval. A google form was distributed via WhatsApp to medical, dental, nursing, and physical therapy students. The survey included demographic details and the 14-item Hospital Anxiety and Depression Scale (HADS). Scores >8 on either subscale indicated anxiety or depression. The sample size, calculated as 196, was increased to 286 for better validity. Participants included first- to final-year students of both genders, while those with pre-diagnosed psychiatric conditions or on related medications were excluded. Convenience sampling was used. SPSS version 26 was used to analyze data.

Results: A total of 286 students (mean age 21.0 ± 2.24 years) participated, including MBBS (50.7%), Nursing (26.9%), DPT (15.7%), and BDS (6.6%) students. Blood group B was the most common, and 86.7% of participants were Rh-positive. Although anxiety was more frequent in students with blood group B, the association was not statistically significant (p=0.082). Depression was most common in blood group O, with significantly higher mean depression scores observed across different blood groups (p=0.04).

Conclusion**:** Anxiety was more frequent in students with blood group B, while depression was most common and significantly associated with blood group O.

KEYWORDS: Anxiety, Blood Group, Depression, Dental, Medical, Physical Therapy, Students

INTRODUCTION

Anxiety and depression are prevalent worldwide among the young adults, contributing substantially to disability, poor quality of life, and reduced productivity.[1] Globally, medical and allied health students are particularly vulnerable to nature of their education and clinical training.[2] Long academic hours, extensive workloads, and high expectations from both teachers and society make this population more prone to anxiety and depression compared with the general student body.[2,3] In Pakistan, the situation is further compounded by multiple stressors. Studies report that medical, dental, physiotherapy, and nursing students often face an overwhelming academic burden, continuous assessments, and a highly competitive learning environment.[4,5,7] Beyond academics, family pressure to excel, peer pressure, challenges of hostel life, social difficulties, and the emotional distress caused by fear of failure, and family problems can further aggravate mental health problems.[6,7,8] Anxiety and depression are common psychiatric conditions globally and serve as key indicators in evaluating mental health.[7] The above-mentioned overlapping psychosocial factors not only increase the risk of anxiety and

Ibrar Ali,[1]
MBBS Student
Muhammad Saqib,[2]
MBBS Student
Abdal Khan,[3]
MBBS Student
Maaz Khan,[4]
MBBS Student
Roha Shah,[5] *MBBS*
Demonstrator
Shireen Jawed,[6] *MBBS, M.Phil, Ph.D*
Professor
[1-6]Frontier Medical and Dental College, Abbottabad, PAK.

Correspondence
Dr. Shireen Jawed
drshireeenjawed@gmail.com

depression affecting students' health and psychological well-being but may also negatively influence their academic performance and future professional competence, thereby influencing their career trajectories.[2,7]

While psychosocial causes are widely acknowledged, recent attention has turned to biological determinants of mental health, including genetic and physiological factors. Among these factors, ABO and Rhesus blood group have been studied for their associations with a range of diseases, such as cardiovascular disorders, cancers, and infections.[8] Emerging evidence suggests that blood groups may also be linked with behavioural traits and psychological susceptibility, including vulnerability to anxiety and depression. However, findings remain inconsistent and context-dependent, highlighting the need for further research in diverse cultural and academic settings.

Untreated poor mental health can severely impair students' quality of life and academic performance, leading to substance abuse, loss of self-confidence, unstable relationships, reduced empathy, and, in extreme cases, suicidal thoughts or attempts.[9] Given that future healthcare professionals form the backbone of the medical system, addressing their psychological wellbeing should be regarded as a public health priority. Understanding whether biological factors such as blood group interact with psychosocial stressors in shaping mental health outcomes can provide novel insights. Therefore, aim of the present study was to determine the frequency of anxiety and depression across different blood groups among medical (MBBS), dental (BDS), physical therapy (DPT), and nursing students in Pakistan. By considering both psychosocial pressures and biological predispositions, this study seeks to contribute to early identification of at-risk individuals and targeted support for vulnerable groups within the healthcare student population.

METHODOLOGY

A cross-sectional study was performed at Frontier Medical and Dental College (FMDC) Abbottabad from April to May 2025. Ethical approval was obtained from the Institutional Review Board of FMDC (Ref no: fmdc /IRB/ 07 /2025). A Google Form was shared via WhatsApp with MBBS, BDS, Nursing, and DPT students of Abbottabad. The first section collected demographic information, including age, gender, blood group, academic year, and discipline, while the second section comprised the 14-item Hospital Anxiety and Depression Scale (HADS) to assess anxiety and depression. A subscale scores greater than 8 out of 21 was considered indicative of anxiety or depression.[10] **S**ample size was determined using the OpenEpi calculator, based on 15% prevalence of anxiety and depression in medical students, with 95% CI and a 5% margin of error. The calculated sample size was 196, but it was maximized to 286 participants to improve validity and generalizability. MBBS, BDS, nursing and DPT students from first year to final year were enrolled in the study by convenience sampling technique. Students diagnosed with behavioral disorders, anxiety, depression, and taking medicines for such conditions were excluded.

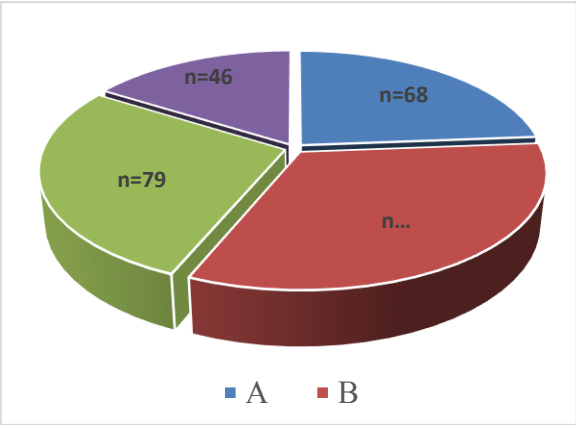
Data was analyzed by using SPSS version 26. Continuous variables like HADS score and age were expressed as mean ± standard deviation (SD). Categorical variables such as, anxiety, depression and blood groups are presented as frequency and percentages. HADS score among various blood groups were compared using ANOVA. A P-value <0.05 was considered statistically significant.

RESULTS

This study included 286 students with mean ± standard deviation (SD) age of 21.0 ± 2.24 years of the total study participants, 145 (50.7%) were from MBBS, 19 (6.6%) were BDS students, 45 (15.7%) were DPT students, whereas 77 (26.9%) belonged to nursing program. Of the total study participants, 176 (61.5%) had anxiety, whereas 143 participants (50%) had depression. Blood group B was the most common among study participants followed by

blood groups O and A.

Figure 1: Frequency of Blood Group among Study Participants (n=286)



Blood group AB was the least prevalent among present study participants (Figure 1). Of the total participants, 248 (86.7%) students were Rh positive while 38 (13.3%) were Rh negative. Anxiety was most frequently found in participants with blood group B followed by those with blood groups O and A (Table 1). Concerning HADS anxiety scores, students with blood group B showed higher anxiety scores than other blood groups, however differences in scores were not statistically significant (P=0.082).

Table 1: Anxiety and HADS Scores Among Various Blood Groups (n=286)

Blood Groups	Frequency of Anxiety	HADS Anxiety Score (Mean)
A	47	8.80
B	51	9.41
O	49	9.06
AB	29	9.30
P value		0.082

Depression was most frequently noticed in students with blood group O followed by B, A and AB blood groups respectively. Mean HADS depression scores were higher in participants with blood group O. Statistically significant difference in HADS depression scores were noticed among various blood groups with p value of 0.04 (Table 2).

Table 2: Depression and HADS Scores among Various Blood Groups (n=286)

Blood Groups	Frequency of Depression	HADS Depression Scores (Mean)
A	35	7.51
B	41	6.97
O	44	8.00
AB	23	7.39
P value		0.04*

DISCUSSION

This study included 286 healthcare students from various disciplines, including MBBS, BDS, DPT, and Nursing. Among them, 176 (61.5%) were found to have anxiety, while 143 (50%) experienced depression. These results demonstrate a strikingly high prevalence of psychological distress in this population, with more than half reporting anxiety and nearly half reporting depression. Such elevated rates reflect a substantial mental health burden among healthcare students, potentially linked to factors such as academic stress, demanding curricula, competitive learning environments, and uncertainty about future career prospects. These findings are in line with previous research in comparable student populations. A study conducted in Sargodha, Pakistan, reported that 69.7% of medical students experienced anxiety and 53.1% experienced depression, with similarly high rates of anxiety among allied health sciences students.[3] Likewise, a study by Talpur et al., conducted in Jamshoro, Sindh, Pakistan, supports the present study's results, reporting that a majority (87%) of dental students had extremely severe anxiety levels, while 45% exhibited severe depressions.[7] A disturbed study–life balance arising from the demanding nature of rigorous medical curricula has been identified as one of the most common causes of anxiety and depression among medical students, as reported by Gondal et al. in a study conducted among students in Lahore and Islamabad.[4] Other contributing factors include

living in hostels, family pressure, peer pressure to succeed in examinations, and concerns about future career prospects all of which contribute to emotional distress among healthcare students.[6]

There are limited recent investigations exploring the relationship between ABO blood types and psychiatric disorders such as anxiety and depression, although the specific risk-conferring blood type has differed among these studies.[11] The present study addresses this significant gap in the literature, thereby providing novel contributions from Pakistan to the existing global body of knowledge. In our study, blood group B was the most frequent, while AB was the least common among the study participants. With regard to the Rhesus factor, the majority of students were Rh positive. Previous studies conducted in Pakistan are consistent with the findings of the present study.[8,12,13]

In the present study, anxiety was most commonly observed among individuals with blood group B; however, no significant differences were found in mean HADS scores for anxiety across the various blood groups. A previous study conducted in Faisalabad, Pakistan, supports this finding, as it also reported higher levels of severe anxiety among participants with the blood group B phenotype.[8] Concerning differences in anxiety scores, the present results are in accordance with study by Zadeh et al., which likewise did not find a statistically significant difference among blood groups in terms of anxiety scores.[14] In contrast to the present findings, Pisk et al. reported that anxiety develops three times more frequently in individuals with the AB blood group as compared to other phenotypes.[15] This discrepancy suggests that the association between blood groups and anxiety may vary across different ethnicities.

In the present study, depression was most frequently found among participants with blood group O. The present results are validated by the highest mean HADS depression scores among individuals with blood group O, showing a statistically significant difference in mean HADS scores across blood groups. Similar to the present findings, previous studies have also indicated a higher risk of depressive symptoms in individuals with blood type O compared to non-O individuals.[16] One study suggested that those with blood group O may cope poorly with stress due to a reduced ability to clear catecholamines released during stressful conditions.[8] Similar to present study, a German study observed that depression appeared to be more prevalent among individuals with blood type O compared to other ABO groups, although, these differences did not reach statistical significance.[11]

In contrast, present study found a significant difference in mean depression scores between blood group O and other ABO types, suggesting a possible link that warrants further investigation. However, inconsistent findings have been reported in other studies. A previous Pakistani study found that depression was most prevalent among individuals with blood group A, followed by those with blood group O,[8] while an Iranian study did not find any significant differences in depression scores across blood groups.[17]

In light of these findings, it is imperative to prioritize early screening for anxiety and depression among healthcare students, particularly those enrolled in MBBS, DPT, and Nursing programs. Proactive identification of at-risk individuals and timely intervention can play a crucial role in reducing psychological morbidity, thereby fostering better mental well-being and ensuring a healthier future healthcare workforce.

Limitations: The cross-sectional design of this study limits causal inference, and the relatively small sample size further restricts the generalizability of the findings.

CONCLUSION

Blood group B was the most frequent among the study participants. Anxiety was evenly distributed across all blood groups, whereas depression was more common in individuals with blood group O, who also exhibited higher HADS depression scores

compared to other blood groups.

Conflict of Interest: None

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Author Contributions:

Ibrar Ali: Study design, data collection, menu script, writeup / review + approved.

Muhammad Saqib: Study design, data collection, menu script, writeup / review + approved.

Abdul Khan: Study design, data collection, menu script, writeup / review + approved.

Maaz Khan: Study design, data collection, menu script, writeup / review + approved.

Roha Shah: Study design, data collection, menu script, writing review and approved.

Shireen Jawed: Study concept, design, statistical analysis result writeup & interpretation, supervise throughout the review and approved research work.

All authors are equally accountable for research work

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